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METHODS FOR THE DETECTION OF RENOVATED BUTTER.

[Cooperative Work, Association of Official Agricultural Chemists, 1904.]

MELTING TEST.

Put some of the butter in a test tube or narrow beaker and heat in the boiling water oven—or, to obtain the clearest possible results, in an oven at 60° to 70° C. Observe after one-half hour to one hour. Renovated butter always melts turbid, while nearly all genuine butters melt with a clear fat. If they are very much broken down by age, the fat will sometimes be a little cloudy, seldom if ever turbid.

Note.—Samples that have been melted and shaken while cooling, in preparation for analysis, will nearly always melt turbid.

BOILING TEST.

Perform this test in the usual manner with a dessert or tablespoon; or with a test tube in the manner described in the Proceedings of the Eighteenth Annual Convention of the Association of Agricultural Chemists, 1901,[1] using butter to the depth of 1¼ inches when melted in the 6-inch test tube.

Oleomargarine and renovated butter yield very little, if any foam, and boil with a crackling sound, while genuine butter yields foam in greater or less abundance (very aged butters, or ladled butters, yield usually the more moderate amounts) and boil, if not "quietly," at least with absence of the *crackling* sound.

MICROSCOPIC EXAMINATION.

[Magnification about 85 diameters.]

Mounting.—Place the volume of one to two pinheads of butter from a freshly cut surface upon a slide and press it out quite thin under a cover glass, avoiding any lateral motion. Put three or four such mounts

[1] U. S. Dept. of Agr., Bureau of Chemistry, Bul. No. 67, p. 115.

upon the slide; and since the particles of butter are so small it is better to study at least six mounts, two slides, in order to get true results.

(*a*) *Light field.*—Observe as to smoothness or roughness; as to the abundance, size, and color of the casein spots, if any are seen. Observe whether they are mostly dry or inclosed in water globules. Report any other appearances observed.

(*b*) *Dark field* (light from below screened off).—Observe the casein spots, whether appearing white and *gelatinous* or white and *glistening*. (This last is seen in some pasteurized butter.)

(*c*) *With polarized light, nicols crossed.*—Look for fat (or fat-acid) crystals, perfect or imperfect. The latter designate as flakes, frostiness, or haziness, according to appearance.

(*d*) *With polarized light and a selenite plate, blue and yellow, below the stage.*—Observe colors on the blue field. Purple (or violet-red, perhaps) is nearly always seen with rancid butter of whatever kind. Fresh renovated butter may or may not show it. Therefore, this color signifies nothing of importance. Its presence or absence should, however, be reported to indicate the condition of the butter. Look for other colors in connection with any supposed fat crystals that may have been discovered with the crossed nicols alone. Red, pink, or flesh color, brass-yellow and green may in such cases appear on the blue field.

(*e*) Place the slide in an oven at 60° to 70° C., for five to ten minutes and examine immediately, with plain light, with and without substage illumination, i. e., in "light field" and "dark field" as these terms are used above.

Observe the condition of the curd—whether it is in straggling, moss-like, or fleecy forms (the latter showing only fine particles in the dark field) or in circles; or whether it is in dense solid masses, and the size of same.

NOTE.—This mode of observation appears to give all the information that is furnished by the Hess and Doolittle "curd test," with more certainty and less work.

THE WATERHOUSE TEST, MODIFIED.

Follow the method as given in the Proceedings of the Eighteenth Annual Convention of the Association of Official Agricultural Chemists, 1901,[1] and in the Proceedings of the Twentieth Convention, 1903.[2]

As teaspoons vary in size it should be stated that about 8 grams is the amount of butter intended by the words "a slightly rounded teaspoonful."

Not only the main result, i. e., whether or not gathering took place, should be reported, but also (1) the number of minutes before gather-

[1] U. S. Dept. of Agr., Bureau of Chemistry, Bul. No. 67, p. 127.
[2] U. S. Dept. of Agr., Bureau of Chemistry, Bul. No. 81, p. 81.

ing occurred; (2) the temperature of the water in the pan and of that in the cup at the moment of gathering or at the end of ten minutes if gathering did not occur; (3) the appearance of the butter, whether oily or not, as it lies upon the warm water before the stirring is begun.

NOTE.—At least some pasteurized butters (butters made from pasteurized cream) gather in the test, but are slower in gathering than are renovated butters as a rule; and they do not present the oily appearance before stirring.

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